

Box III

The International Searching Authority has determined that this international application contains multiple (groups of) inventions, as follows:

1. Claims 1, 2, 3 (when dependent on 2), 4, 6 (when dependent on 4)

Production of a hole using a pulse length that is longer in a first method step than in one of the last method steps, the laser pulse length being continuously increased.

2. Claims 1 + 3

Production of a hole using a pulse length that is longer in a first method step than in one of the last method steps, one of the laser pulse lengths used being shorter than 100 ns.

3. Claims 1 + 4 + 5, 6 – 9 (when dependent on 5)

Production of a hole using a pulse length that is longer in a first method step than in one of the last method steps, in a layer system comprising a ceramic layer.

4. Claims 1 + 10, 11 (when dependent on 10), 12 (when dependent on 10)

Production of a hole in a component of a steam turbine by means of method steps in which different pulse lengths are used.

5. Claims 1 + 11, 1 + 12

Production of a hole using a pulse length that is longer in a first method step than in one of the last method steps, when producing or reworking a component.

6. Claims 1 + 13, 16-19

Machining of a component using at least two lasers with different pulse lengths.

7. Claims 1 + 14, 1 + 15

Production of a hole using a pulse length that is longer in a first method step than in one of the last method steps, an external upper region being produced in a first method step.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/009793

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B23K26/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B23K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02/092276 A (MORIYASU MASAHARU ; ITO KENJI (JP); TAKENO SHOZUI (JP); KOBAYASHI NOBU) 21 November 2002 (2002-11-21) figure 1	1,4,6
Y		2
A		3
X,P	& EP 1 386 689 A (MITSUBISHI ELECTRIC CORP) 4 February 2004 (2004-02-04) paragraph [0051]; figure 1	1
A	US 5 073 687 A (INAGAWA HIDEHO ET AL) 17 December 1991 (1991-12-17)	1,4,6
Y	column 3, line 40 - line 52 column 8, line 1 - line 4 column 9, line 36 - column 10, line 22 ----- -/--	2

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

21 December 2004

Date of mailing of the international search report

08.04.2005

Name and mailing address of the ISA

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP2004/009793

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 939 010 A (KANAOKA MASARU ET AL) 17 August 1999 (1999-08-17) column 3, line 40 - line 52 column 6, line 45 - line 65; claims 1,2; figures 5,6 -----	1,3,4,6
A	US 6 479 788 B1 (AOYAMA HIROSHI ET AL) 12 November 2002 (2002-11-12) column 3, line 18 - line 25 column 4, line 32 - column 5, line 55 column 6, line 45 - column 7, line 13; claims 1,2; figures 1-6 -----	1,3,4,6
A	US 6 172 331 B1 (CHEN XIANGLI) 9 January 2001 (2001-01-09) cited in the application -----	
A	US 6 054 673 A (CHEN XIANGLI) 25 April 2000 (2000-04-25) cited in the application -----	
A	DE 100 63 309 A (MTU AERO ENGINES GMBH) 11 July 2002 (2002-07-11) cited in the application -----	

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat. Application No

PCT/EP2004/009793

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 02092276	A	21-11-2002	CN 1531471 A	22-09-2004
			EP 1386689 A1	04-02-2004
			WO 02092276 A1	21-11-2002
			TW 523436 B	11-03-2003
			US 2004173942 A1	09-09-2004

EP 1386689	A	04-02-2004	EP 1386689 A1	04-02-2004
			US 2004173942 A1	09-09-2004
			CN 1531471 A	22-09-2004
			WO 02092276 A1	21-11-2002
			TW 523436 B	11-03-2003

US 5073687	A	17-12-1991	JP 4041091 A	12-02-1992
			JP 3027885 A	06-02-1991
			JP 3142087 A	17-06-1991

US 5939010	A	17-08-1999	JP 11097821 A	09-04-1999
			CN 1212195 A ,C	31-03-1999
			DE 19802127 C1	15-04-1999
			KR 265578 B1	15-09-2000
			TW 447228 B	21-07-2001

US 6479788	B1	12-11-2002	JP 11145581 A	28-05-1999

US 6172331	B1	09-01-2001	US 6054673 A	25-04-2000

US 6054673	A	25-04-2000	US 6172331 B1	09-01-2001

DE 10063309	A	11-07-2002	DE 10063309 A1	11-07-2002
